

NASA TECH BRIEF



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Division, NASA, Code UT, Washington, D.C. 20546.

Spectral Emission Measurement of Igneous Rocks Using a Spectroradiometer

A spectral-emission survey was conducted on samples of 23 igneous rocks varying in texture from granite through dunite to obsidian and rhyolite. Most samples had at least one rough, flat surface and carried very little surface dust. The temperature of the samples and the blackbody was maintained at between 46° and 47°C, using a quartz-iodide lamp.

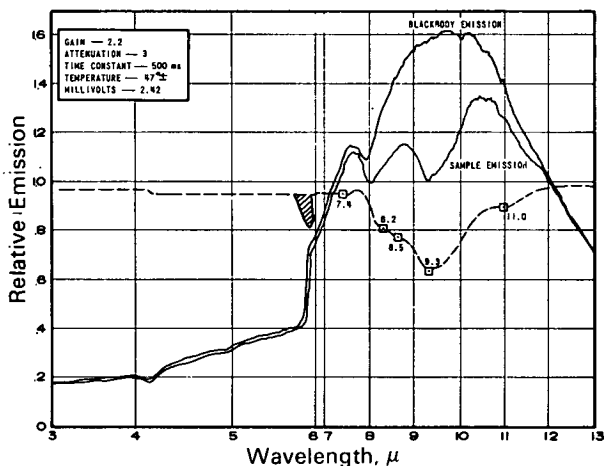


Figure 1. Relative Emission from Syenite (Victor, Colorado)

A commercial, circular, variable-filter spectroradiometer was used at a scan rate of one scan per minute. Wavelengths between 2.8 and 13.5 μ were covered. The signal was fed to an x-y recorder that plotted the relation between output and wavelength.

The spectra yielded and the spectral emissivity of each sample are reported graphically (Fig. 1). Included for comparison are spectra obtained by earlier investigations of granite, quartz syenite (Fig. 2), olivine gabbro, pyroxene aplite, rhyolite pumice, and plagioclase

basalt. The samples, along with the emission minima recorded for each, are listed in a table.

The survey demonstrated that this type of spectroradiometer can be used for either close or remote identification of rocks not heated to high temperatures. The instrument, though it cannot identify mixed species or fine particles, easily yields reproducible data spectra with excellent signal-to-noise ratios and readily identifiable spectral details, including differences in subclasses.

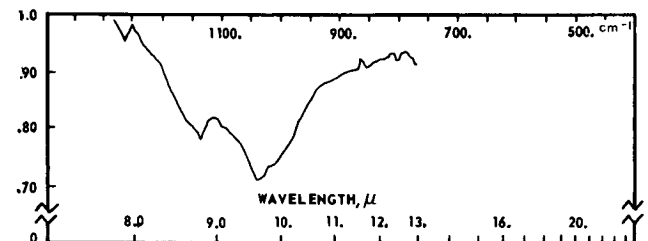


Figure 2. Earlier Normal Spectral Emission from Quartz Syenite (Gorud, Norway)

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Code A&TS-TU
Huntsville, Alabama 35812
Reference: TSP70-10661

Patent status:

No patent action is contemplated by NASA.

Source: W. D. Hunton
Marshall Space Flight Center
(MFS-20837)

Category 03,04